To what extent does the number of visitors who are present currently affect the quality of visitor experiences at Exit Glacier?

National Park Service photograph

Figure 1: Exit Glacier developed area.

Figure 2: Left: A typical sequence of photos used to estimate the number of visitors on the Overlook Loop Trail during the quasi-experimental study of direct reactions to use levels.

National Park Service photographs

Managing Exit Glacier's Popularity: Social Science Looks at Visitor Experiences

by Mark E. Vande Kamp, Darryll R. Johnson, Robert E. Manning

Introduction

The developed area at the base of Exit Glacier provides visitors with the rare opportunity to easily approach a glacier on foot. Visitors can park less than a mile from the glacier terminus and walk to the face of a towering mass of ice *(Figure 1)*. When the ice melts into safe configurations, visitors hiking the Overlook Loop Trail can even touch the glacier at selected locations. The Exit Glacier developed area (hereafter, Exit Glacier) is the only area of Kenai Fjords National Park that is accessible by road and is a popular tourist destination, with 132,695 visits in 2003 *(National Park Service 2004)*. The developed area also serves as the trailhead for the Harding Icefield Trail that leads visitors upward through sensitive alpine habitat. Visitation to Exit Glacier grew quickly in the early 1990s *(National Park Service 2004)*, and in 2001 the road to the area was paved, creating the potential for even greater visitation. A 1995 Development Concept Plan for the area *(National Park Service 1995)* strongly recommended that studies of visitation be completed to help managers prevent unacceptable impacts due to increased visitation.

When we began talking with Kenai Fjords managers about conducting studies of visitors at Exit Glacier, they had already decided to use the Visitor

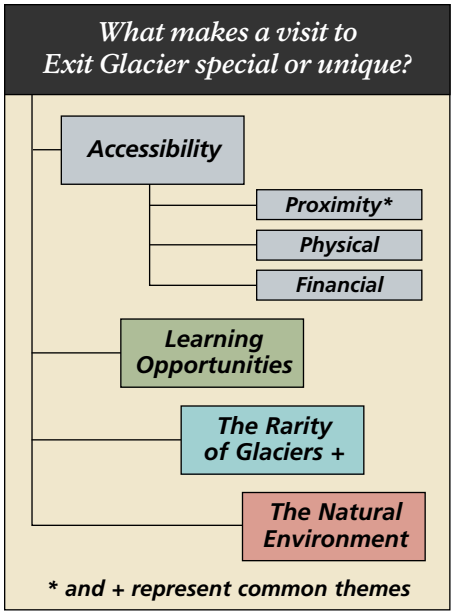

Figure 3. Conceptual map of responses to one of the primary questions in the qualitative interview study of visitors to the Exit Glacier developed area.

Experience and Resource Protection (VERP) framework (National Park Service 1997) to plan for and manage possible negative impacts of recreational use. As they began to apply the VERP framework, the planning team identified a wide range of information about visitors and their experiences needed to apply VERP effectively. Some of those needs are described by questions such as:

- What do visitors see as the "Exit Glacier experience"?
- Do some groups of visitors have characteristics or engage in activities that make them more sensitive to the presence of other visitors?
- To what extent (if any) does the number of visitors who are present currently affect the quality of visitor experiences at Exit Glacier?
- At what point might the number of visitors who are present unacceptably degrade the quality of visitor experiences at Exit Glacier?

In order to address this range of questions, we designed a research program that included a variety of studies using a number of research methods. In this article we briefly describe several studies that used different research methods, the reasons why each method was chosen, and some highlights of the information we collected. We will also discuss several findings of the research that illustrate how the diverse information was integrated to help managers of Exit Glacier plan policies to effectively manage visitation.

Research Methods and Questions

Of the questions given high priority by managers, the four listed above are given as examples, because each of them was addressed by a different research method. The four research methods were: 1) qualitative interviews, 2) a mail survey, 3) a quasi-experimental survey of reactions to experiences, and 4) an experimental survey of reactions to photographs.

Qualitative Interviews

Qualitative interviews are conducted verbally by trained interviewers and generally use open-ended questions that encourage respondents to discuss opinions or experiences that may be complex *(Tashakkori and Teddlie 1998)*. The method is qualitative because it describes the range of opinions or experiences present in a population. In contrast, quantitative methods provide specific estimates of the number of visitors with particular opinions or experiences.

Qualitative interviews were chosen to address the question, *"What do visitors see as the 'Exit Glacier experience'?"* because the question was difficult to answer by asking visitors anything other than open-ended questions. We could have constructed closed-ended questions for use in a mail survey or other quantitative study, but existing information was insufficient to support confidence in their results. It was possible that visitors might have complex and unique experiences that we did not anticipate or understand. To be effective, closed-ended questions, such as those asking respondents to circle answers from a list, should include all the common responses, and ideally, the less common responses as well. If they do not, they are likely to limit or bias responses.

Kristin Anderson, a researcher trained in qualitative interviewing, asked 89 groups of Exit Glacier visitors several probing questions. After transcribing and analyzing the interviews, she found that responses fell into four broad categories. *Figure 3* shows the categories as well as some more specific themes (see *Vande Kamp et al. 2003* for more a detailed report). The most common response revolved around the theme of proximity. Participants were delighted to be able to get so close to the glacier. One woman said, *"I think that probably the uniqueness is that you can get right up there at the glacier and actually touch the ice. I mean that is so fabulous. Being able to look in a cave, or you know look up and see the fissures and the blue ice, you are so close, that's what probably makes it special."*

Another common type of response indicated that the glacier itself, as a rare natural feature, was the defining characteristic of visitors' experience. As one participant said, *"It's not every day you see a hundred feet of ice."*

The results of the qualitative interviews were relatively unsurprising. The most commonly described characteristics of the Exit Glacier experience concern the glacier and the ability of visitors to closely approach it. The only category of responses not directly associated with the glacial ice concerned the larger context of the natural environment preserved in the area. After hearing of such results, critics might wonder if it was necessary to conduct a study that resulted in obvious conclusions. Many things seem obvious in retrospect, but without systematic research, managers could not be certain whether some visitor groups entered the area for complex or unique experiences that were not anticipated.

Mail Survey

Among other purposes, the mail survey addressed the question, *"Do some groups of visitors have characteristics or engage in activities that make them more sensitive to the presence of other visitors?"* The primary advantage of a mail survey is the ability to send a relatively large number of questions to visitors for completion at their leisure. Minimizing intrusion on visitors' recreation is important, and mail surveys also tend to reduce refusals to participate.

High response rates increase the validity of the survey by making the results more likely to reflect the views of all visitors. A second advantage is that the short contact procedure allows survey workers to approach and obtain the cooperation of a larger sample of visitors in a given period of time. Our mail survey distributed two different versions of the study questionnaire and obtained responses from 458 and 455 respondents. Approximately 75 percent of respondents who gave contact information returned completed questionnaires. A wide range of questions about visitors, their activities, and their experiences at Exit Glacier provided a basis for assessing visitors' similarity.

A statistical technique called cluster analysis was used to identify groups of visitors who held similar motivations for visiting Exit Glacier. A technical description of the analysis and the details of results can be found in the project report *(Swanson et al. 2003)*. The cluster analysis and related statistical tests were intended to detect visitor groups who were particularly sensitive to other visitors; but the results consistently showed a high degree of overlap in the motivations of the different groups of visitors, the activities in which they engaged, and the levels of crowding they reported. For example, the crowding ratings for every group identified by the cluster analysis fell between the two lowest numbers on the crowding scale (the lowest number was labeled "not at all crowded"). In general, Exit Glacier visitors showed considerably more similarities than differences in the experiences they desired and the impact of other visitors on those experiences.

Quasi-experimental Survey of Reactions to Experiences

A quasi-experiment is a research design in which observations are made across a range of conditions that are not randomly assigned *(Campbell and Stanley 1963)*. For example, the respondents in our survey on the Overlook Loop Trail encountered different numbers of visitors; but rather than manipulating those numbers and randomly assigning respondents to different conditions, we simply recorded the level of visitation they encountered.

We selected a quasi-experiment to address the question, *"To what extent (if any) does the number of visitors who are present currently affect the quality of visitor experiences at Exit Glacier?"* primarily because it was not feasible to manipulate visitation levels on the Overlook Loop Trail. At the same time, it was critical that managers examine the relationship between use levels and visitor experiences in this area of Exit Glacier, if the VERP process was to establish an effective balance between visitation and its impact on visitor experience. The study focused on the Overlook Loop Trail because it is the area in which visitors can approach close to the glacial ice. Visitors also approach the glacier from the outwash plain, but only when that area is not blocked by Exit Creek.

Respondents to the survey were approached by a survey worker stationed at the end of the trail section that most closely paralleled the glacial ice. Visitors who had just walked near the ice were asked to make a series of judgments about the number of other visitors they encountered. During the surveys, another survey worker photographed the Overlook Loop Trail on a set interval. The number of visitors that respondents encountered was estimated based on the number of visitors who were visible in the photographs taken during their hikes *(Figure 2)*.

Analyses of the quasi-experiment supported three conclusions: small numbers of visitors (average of 7.5, maximum 26) were generally seen in the photographs of the Overlook Loop Trail; few respondents felt

National Park Service photograph

Figure 4. Photo of the type used in the experimental survey of reactions to simulated use levels. Each photo used the same background, and the number of visitors in the picture was manipulated digitally.

National Park Service photograph

Figure 5. The opportunity to closely approach a glacier is a focal point of visitors' experiences at the Exit Glacier developed area.

current visitor density was high enough to detract from their experience; and the relationships between the observed (photographed) visitation levels and survey responses were weak and inconsistent. The low visitor densities and small number of respondents reporting negative impacts undoubtedly limited the statistical power of the analyses testing their relationships.

In general, the evidence that current conditions did not detract significantly from visitor experiences should encourage managers. However, the analyses should not be interpreted as evidence that visitor density will have no impact on future visitor experiences at all possible use levels.

Experimental Survey of Reactions to Photographs

The survey of reactions to a range of simulated use levels used a repeated-measures experimental design *(Campbell and Stanley 1963)*. Respondents made a series of different evaluative judgments about six photographs. The experimental manipulation was contained in the photos—each showed the same view of the Overlook Loop Trail, except that the number of visitors who were present ranged from zero to 50 *(Figure 4)*. This type of "image-capture survey" has been used in a wide variety of settings *(Manning et al. 1996, Manning et al. 1999, Manning et al. 2002)*, but it was particularly well suited to Exit Glacier because it allowed us to collect judgments about higher levels of visitor use than are currently seen.

In general, the photos showing 20 to 40 visitors on the Overlook Loop Trail were the point at which more than half the respondents rated the levels of visitor use negatively. In one of the most interesting judgments, about a quarter of respondents said that the photo with 30 visitors showed the use level that should prompt the NPS to restrict visitation. However, another quarter of respondents said that the NPS should not restrict visitation at all.

The research literature has not established that respondents' reactions to the photos correspond to their reactions if they were to actually experience the pictured conditions. Therefore, the experimental and quasi-experimental surveys were designed to test the level of correspondence by asking respondents to make the same series of judgments. However, the overlap in the range of visitor density depicted in the photographs and the range of actual conditions turned out to be minimal. The photographs taken in the quasi-experimental study showed that approximately three-quarters of the respondents experienced conditions in which fewer than ten visitors were visible, and 99% experienced visitor densities lower than those shown in the third ICS photograph (20 visible visitors). Thus, the statistical power of the comparison between the studies was too weak to support firm conclusions about the correspondence between the results. Regardless, there is currently no other practical method to gather data concerning visitors' evaluations of visitor density levels outside the current range at Exit Glacier.

Integrating Data Across Studies to Support Conclusions

In addition to providing a range of data suited to addressing a wide variety of questions, the results of diverse studies can also be combined in at least two useful ways. First, results from different studies that address the same question serve as a form of triangulation that increases confidence in the validity of their shared conclusion. Second, the results of studies addressing slightly different questions can be combined to support conclusions that neither study could address independently.

Triangulation can be seen in the results of the interviews and the mail surveys. One conclusion of the qualitative study was that many visitors felt that the ability to closely approach the glacier was a unique aspect of their experience. Several results from the mail survey also emphasize the importance of approaching the ice. For example, when choosing from a list of 15 activities, more than three-quarters of respondents reported that "Viewing Exit Glacier" or "Walking Up To and/or Touching Exit Glacier" were most important to the quality of their experience. Together, these and other results of the two research studies emphasize that approaching Exit Glacier is a critical aspect of visitor experiences.

The number of visitors on the Overlook Loop Trail is important to the VERP process because it is a potential indicator that might be monitored to protect visitor experiences. The experimental survey and the quasi-experimental survey both address questions about the relationship between use levels and experience quality on the Overlook Loop Trail. However, their differences allow them to provide data that are unique in their implications for the VERP process. For example, the results of the quasi-experimental survey showed that few respondents felt current visitor density was high enough to detract from their experience. This finding suggests that managers could allow use levels to rise and still protect the experiences desired by current visitors, but it does not suggest the point at which most current visitors would feel that use levels would detract from their experiences. In contrast, the results of the experimental survey reflect visitors' judgments of high levels of use that might occur in the future. By asking respondents to make judgments about a range of photographs that included use levels much higher than current levels, the study provided data that can help managers make a more informed decision about the maximum use levels they should allow on the Overlook Loop Trail before taking action.

Conclusion

The multi-method research program undertaken at Exit Glacier was not without drawbacks. The researchers designing the studies were required to have diverse skills and to collaborate effectively. Implementing the studies was complex, and field workers sometimes had difficulty understanding and carrying out the many different tasks they were assigned. And although it was cheaper to conduct the studies concurrently than to spread them out over several field seasons, it cost more to conduct the multi-method research program than it would have to conduct only one or two of the highest priority studies. Despite these drawbacks the research program provided a wealth of information useful in planning for the future management of Exit Glacier. Only a few small portions of that information have been described in this article, but we hope that they illustrate how the breadth of the multi-method research program provided park managers with an integrated set of information about visitor experiences and use levels. Such information can help managers develop policies to assure that the quality of visitors' experiences is not degraded by the level of use they encounter in the Exit Glacier developed area.

REFERENCES

Campbell, D.T., and J.C. Stanley. 1963. *Experimental and quasi-experimental designs for research.* Rand McNally. Chicago, IL.

Manning, R., S. Lawson, P. Newman, D. Laven, and W. Valliere. 2002. *Methodological Issues in Measuring Crowding-Related Norms in Outdoor Recreation.* Leisure Sciences 24: 339-348.

Manning, R., D. Lime, W. Freimund, and D. Pitt. 1996. *Crowding Norms at Frontcountry Sites: A Visual Approach to Setting Standards of Quality.* Leisure Sciences 18: 39-59.

Manning, R., W. Valliere, B. Wang, and C. Jacobi. 1999. *Crowding Norms: Alternative Measurement Approaches.* Leisure Sciences 21: 97-115.

National Park Service, U.S. Department of the Interior. 1995. *Kenai Fjords National Park: draft frontcountry development concept plan/environmental assessment.* Denver Service Center. NPS D-24.

National Park Service, U.S. Department of the Interior. 1997. *The Visitor Experience and Resource Protection (VERP) Framework: A Handbook for Planners and Managers.* Denver Service Center. Denver, CO.

National Park Service, U.S. Department of the Interior. 2004. Visitor Statistics Website.

Swanson, J.E., M.E. Vande Kamp, and D.R. Johnson. 2003. *Social Science Research for Managing the Exit Glacier Fee Area of Kenai Fjords National Park: Volume 2, A Survey of Visitors to the Exit Glacier Fee Area.* Technical Report NPS/CCSOUW/NRTR-2003-05. PNW Cooperative Ecosystem Studies Unit, National Park Service, College of Forest Resources, University of Washington.

Tashakkori, A., and C. Teddlie. 1998. Mixed methodology: combining qualitative and quantitative approaches. Sage Publications. Thousand Oaks, CA.

Vande Kamp, M.E., J.E. Swanson, and D.R. Johnson. 2003. *Social Science Research for Managing the Exit Glacier Fee Area of Kenai Fjords National Park: Volume 1, Visitor Experiences and Visitor Use Levels.* Technical Report NPS/CCSOUW/NRTR-2003-05. PNW Cooperative Ecosystem Studies Unit, National Park Service, College of Forest Resources, University of Washington.